UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/583,792	04/02/2007	Seung-Que Lee	1403-11	8549

66547   7590   01/19/2012
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EXAMINER
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ART UNIT	PAPER NUMBER
2617	

MAIL DATE	DELIVERY MODE
01/19/2012	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

<table>
<tr><td rowspan="2">Office Action Summary</td><td colspan="2">Application No.</td><td>Applicant(s)</td></tr>
<tr><td colspan="2">10/583,792</td><td>LEE ET AL.</td></tr>
<tr><td colspan="2">Examiner</td><td>Art Unit</td><td></td></tr>
<tr><td></td><td colspan="2">STEVEN KELLEY</td><td>2617</td><td></td></tr>
</table>

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>19 September 2011</u>.

2a) ☐ This action is **FINAL.**   2b) ☒ This action is non-final.

3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5) ☒ Claim(s) <u>1,2,5-10 and 15</u> is/are pending in the application.

    5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☒ Claim(s) <u>1,2, 5-10 and 15</u> is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10) ☐ The specification is objected to by the Examiner.

11) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

2.   Claims 1-2, 6-8, 10 and 15 are rejected under 35 U.S.C. 103(a) as being

unpatentable over U.S. Patent 7,461,164 to Edwards et al. (hereinafter "Edwards") in

view of the IEEE article from September 2000 entitled "IP QoS Delivery in a Broadband

Wireless Local Loop: MAC Protocol Definition and Performance Evaluation" by Baiocchi

et al. (hereinafter "the MAC Protocol article").

Regarding claim 1, Edwards teaches an OFDMA-TDMA (Orthogonal Frequency

Division Multiplex--Time Division Multiple Access) based wireless Internet terminal

comprising: a QoS profile storing information about a QoS policy (see QoS module 58

as shown in Fig. 7 and described in columns 10-11, which "stores QoS policies", as

recited); a first module (see software-based MAC component 24A), comprising:

classifier for identifying a type of packet traffic and classifying data packets

corresponding to the packet traffic according to the QoS policy stored in the QoS profile

(see QoS module 58, which "classifies", as recited); a first priority controller that gives

first priorities to the classified data packets according to the QoS policy (see software-

based MAC component 24A and see column 9, lines 32-35, which teach that the

"software-based MAC component 24A also has a number of virtual queues to assist

QoS functions"); and a second module (see hardware-based MAC component 24B),

comprising a second priority controller for determining priorities of the PDUs according

to packet information of the PDUs (see hardware-based MAC component 24B, as

shown in Fig. 6 which includes transmit logic 34 and transmit queues 36 and 38, where

higher priority may be given to one of the queues (as taught in column 9, lines 17-20,

where the "characteristics of the data packets" may be time-critical packets as

described in column 2, lines 35-41, policies included in command structures from the

software-based MAC component 24A (such as shown in Figs. 9-10) or the "prioritization

scheme" taught in column 11, lines 1-3).

Regarding the features of claim 1, which recite:

wherein the packet information is based on a header or an identifier of a

corresponding data packet, and characteristics of the data packets (see command

structure 60 (included in packet headers) which includes characteristics of the packet);

a transmitter for arranging the PDUs given the second priorities in an allocated

bandwidth to transmit the PDUs (see transmit logic 34 which arranges the PDUs in

allocated bandwidth (to be transmitted by radio 30 as shown in Fig.2);

wherein the first module is constructed in a MAC layer by software and the

second module is constructed in the MAC layer by hardware (see 24A and 24B);

wherein the first module further comprises the plurality of QoS queues for

dividing and storing the data packets classified by the classifier, and a plurality of priority

queues by dividing and storing the data packets admitted by the admission controller

based on their priorities (see column 9, lines 32-35, of Edwards, which teaches that the "software-based MAC component 24A also has a number of virtual queues to assist QoS functions" and regarding the recited "priority queue", see transmit queues 36 and 38 (as shown in Figs. 6 and 8), which store packets based on priority, as recited);

wherein the classifier identifies the type of packet traffic and stores a data packet of the packet traffic in one of the plurality of QoS queues based on the QoS policy corresponding to the identified type (see column 9, lines 32-35, which teach that the "software-based MAC component 24A also has a number of virtual queues to assist QoS functions");

wherein the type of packet data traffic comprises at least one of audio data and burst data (see column 5, line 59, which teaches "voice" or audio data, as recited).

Regarding the recited features related to the "admission controller", such as "an admission controller for determining admission or discarding of the classified data packets provided from a plurality of QoS queues based on a current call state and characteristics of the classified data packets", and the additional references to the admission controller, although any packet which is stored in the queues after being classified must have had its' "admission determined", Edwards does not explicitly teach "an admission controller". Additionally, it is noted that although Edwards teaches generating "packets" (which could be considered as a "protocol data unit" or PDU), Edwards does not explicitly teach a "PDU maker for generating PDUs from the data packets given the first priorities".

The MAC protocol article (which is for an "OFDMA-TDMA (Orthogonal Frequency Division Multiplex--Time Division Multiple Access) based wireless Internet terminal", as recited) teaches methods of scheduling packets for transmission. As shown in Fig. 3 of the MAC protocol article, packet traffic related functions include "classifying" the packets into "guaranteed bandwidth" or "best effort" queues and providing the packets from these queues to a MAC scheduler which uses a MAC fair scheduling algorithm. As described in sections B and C on page 1612 of the MAC protocol article (and shown in Fig. 6 on page 1613), the MAC signaling section and MAC fair scheduling algorithm sections teach the use of MAC PDUs for scheduling and transmission purposes, which for scheduling purposes based on available bandwidth results in accepting/dropping of classified packets (recited "admission controller determines admission or discarding based on current call state and characteristics and based on a degree of importance lower than a predetermined degree based on a network state"). Additionally, see section B (on page 1616) of the MAC protocol article "Admission Control", which details "rules for GB flows", which relate to "admission or discard of packets". The MAC scheduler also "generates PDUs from the packets given priorities", as recited. Additional details of "admission control" are found in the last paragraph on page 1609, the first paragraph on page 1612 and the "admission control" section B, which begins on page 1616.

Therefore, as both Edwards and the MAC protocol article teach packet QoS features implemented in the MAC layer, it would have been obvious to one of ordinary skill in the art to modify the software module of Edwards to include the admission

controller functions (as taught by the MAC protocol article), in order to properly schedule

packets for transmission (after first determining if they should be included in scheduling,

based on bandwidth or time requirements, etc.), as is conventional.

Regarding the features of claim 1 (which incorporated the language previously

recited in claim 5), which recite "a sorting queue for storing PDUs based on the second

priorities of the PDUs assigned by the second priority controller", as described above,

transmit queues 36 and 38 (which are the "sorting queues", as shown in Figs. 6 and 8),

store packets based on priorities which may be determined and assigned by the

transmit logic 34 (recited "second priority controller", where these assigned priorities are

based on the information included in command structure 60), where higher priorities

may be given to one of the queues (as taught in column 9, lines 8-25), which therefore

"store based on the priority". See also column 2, lines 35-41, which teaches that the

"characteristics of the data packets" may be time-critical packets and see column 11,

lines 1-3, which teaches that "transmit logic controls transmission of packets from

queues 36 and 38, possibly implementing a prioritization scheme".

Regarding the amendments to claim 1, which now recite that the second priority

controller "determines data packet types of the PDUs based on headers or an identifier

of the PDUs and determines second priorities based on the determined data packet

types and predetermined priority policy that predetermines priorities of data packet

according to data packet type", as described above, see column 9, lines 20-23 of

Edwards, which teaches that packets from "queues 36 and 38 can be used to separate

packets that should be transmitted in an announcement traffic indication message

(ATIM) period from those that should not". See also column 16, lines 16-24 which

teaches that "MAC H/W component 24B is used to find time to transmit ACK packets".

Therefore, as Edwards also teaches that the second prioritizing of packets (from queues

36 and 38) can also be based on other factors such as time-sensitive packets and ACK

packets (which form the recited "predetermined priority policy") which would have

"headers and/or identifiers" identifying these types of packets which may be included in

command structures from the software-based MAC component 24A, the second priority

controller of Edwards performs these amended claimed features, as recited.

Regarding independent method claim 8, which recites the same features

performed by the structures recited in claim 1, and includes amendments similar to

claim 1, see the rejection of claim 1 above.

Regarding claim 2, which recites "wherein the QoS policy maximizes a bandwidth

utilization rate and minimizes a packet loss rate in a current communication

environment", the QoS policies (and packet processing performed) in Edwards and the

MAC protocol article would broadly "maximize a bandwidth utilization rate and minimize

a packet loss rate in a current communication environment", as recited.

Regarding claim 6, which recites "wherein the PDUs are MAC PDUs, and the

second priority controller determines which one among an ACK packet, a management

message packet, and a user data packet, a corresponding packet is, based on headers

or identifiers of the MAC PDUs and gives the second priories to the MAC PDUS in the

order of an ACK packet, a management message packet and a user data packet

independently from the QoS profile", see column 9, lines 20-23, which teach that

(recited "determined") packets from "queues 36 and 38 can be used to separate packets

that should be transmitted in an announcement traffic indication message (ATIM) period

from those that should not", which is a "management message packet", as recited. See

also column 16, lines 16-24 which teaches that "MAC H/W component 24B is used to

find time to transmit ACK packets". Therefore, as Edwards also teaches that the

second prioritizing of packets (from queues 36 and 38) can also be based on other

factors such as time-sensitive packets and ACK packets (and may be performed "on the

fly" (column 12, line 21)), it would have been obvious to one of ordinary skill in the art to

prioritize the packets (or MAC PDUs as modified by the MAC protocol article) in the

recited order, as time sensitive packets should be prioritized over user data packets, as

is conventional.

Regarding claim 7, which recites "wherein the first priority controller gives data,

which requires real-time transmission, a higher priority than data, which tolerates

transmission delay, based on the QoS policy", see QoS module 58 in MAC SW

component 24B, which would (inherently and/or obviously) give higher priorities to real-

time data (such as voice data), as is conventional.

Regarding claim 9, which recites "wherein arranging the data packets

sequentially sorts the data packets based on the second priorities and arranges the

sorted data packets in an allocated bandwidth," as described above in the rejection of

claim 6, as Edwards also teaches that the second prioritizing of packets (from queues 36 and 38) can also be based on other factors such as time-sensitive packets and ACK packets (and may be performed "on the fly" (column 12, line 21)), it would have been obvious to one of ordinary skill in the art to "arrange" or prioritize the packets based on second priorities as recited, as is conventional.

Regarding claim 10, which recites "wherein providing second priorities determines which one among an ACK packet, a management message packet, and a user data packet, a corresponding packet is, based on headers or identifiers of the MAC PDUs and gives the second priories to the MAC PDUs in the order of an ACK packet, a management message packet and a user data packet independently from the QoS profile", see column 9, lines 20-23, which teach that (recited "determined") packets from "queues 36 and 38 can be used to separate packets that should be transmitted in an announcement traffic indication message (ATIM) period from those that should not", which is a "management message packet", as recited. See also column 16, lines 16-24 which teaches that "MAC H/W component 24B is used to find time to transmit ACK packets". Therefore, as Edwards also teaches that the second prioritizing of packets (from queues 36 and 38) can also be based on other factors such as time-sensitive packets and ACK packets (and may be performed "on the fly" (column 12, line 21)), it would have been obvious to one of ordinary skill in the art to prioritize the packets (or MAC PDUs as modified by the MAC protocol article) in the recited order, as time sensitive packets should be prioritized over user data packets, as is conventional.

Regarding claim 15, which recites "wherein the QoS policy maximizes a

bandwidth utilization rate and minimizes a packet loss rate in a current communication

environment and wherein providing the first priorities to the classified data packets gives

data, which requires real-time transmission, a higher priority than data, which tolerates

transmission delay, based on the QoS policy", see the rejection of clams 2 and 7 above.

3.   Claims 5 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Edwards and the MAC protocol article as applied to claims 1 and 8 above, and further in

view of U.S. Patent Pub. 2004/0160960 to Monta et al. (hereinafter "Monta").

Regarding claims 5 and 9, which now recite "wherein a PDU having a highest

priority is located at the bottom of the sorting queue", the description of the transmit

queues 36 and 38 in Edwards does not explicitly teach storing the PDUs, as recited.

In an analogous art, Monta teaches a system which provides classified packets

from a number of buffers to a packet scheduler. See for example, Fig. 3 which teaches

a packet classifer 302, multiple FIFO memories 304, a packet scheduler 306 and a

Priority Queue 308. As described in sections [0043] to [0045], a packet is given an

initial priority (by classifier 302) and then is placed into one of the FIFO memories 304.

Packet scheduler 306 then checks the priority of the packets from each FIFO 304 and

orders them (based on priority) into the Priority Queue 308. See for example, section

[0043] which teaches "The Packet Scheduler 306 determines where this new entry

should be inserted into the Priority Queue 308 by comparing the priority associated with

the new entry with the priorities of the existing entries in the queue. Since the Priority

Queue 308 is always sorted according to priority, this process simply involves locating

the pair of consecutive entries having priorities that are respectively less than and

greater than (or equal to) the priority of the new entry, and inserting the new entry in

between this pair." Regarding the claim language of "storing the PDU with the highest

priority at the bottom", this language is interpreted to mean that the highest priority

packet (or PDU) is output first, which is how the Priority Queue 308 of Monta stores the

packets.

Therefore, as both Monta and Edwards teach reordering packets after a first

classification/prioritization, it would have been obvious to one of ordinary skill in the art

to modify Edwards to store the PDUs in order (as recited and as taught by Monta), in

order to output the most critical packets first, as is conventional and as would be

desired.

Response to Arguments

4.   Applicant's arguments filed 09-19-11 have been fully considered but are moot in

view of the new grounds of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEVEN KELLEY whose telephone number is (571) 272-5652. The examiner can normally be reached on Monday-Friday, 9AM to 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester Kincaid can be reached on (571) 272-7922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Steven S. Kelley/

Patent Examiner
Art Unit 2617